June 18, 1935. A. R. ROWE 2,005,169

CASTING METAL INGOTS

Filed Aug. 27, 1932

Fig. 1.

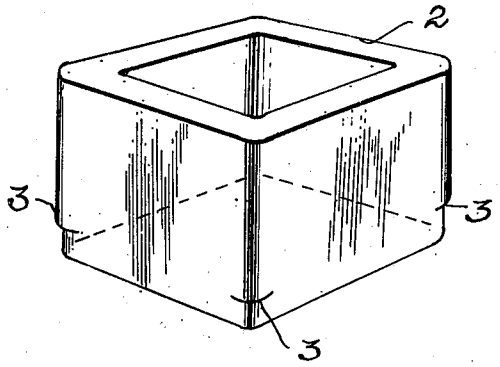


Fig. 4.

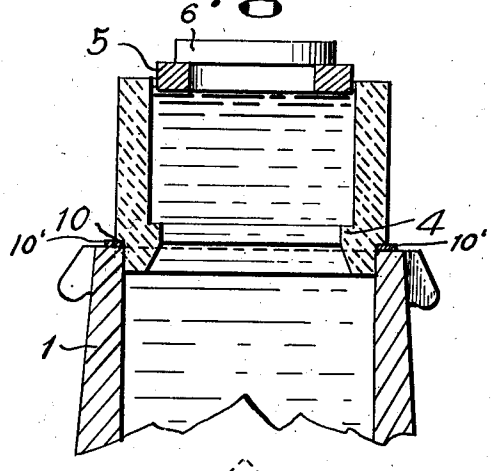


Fig. 2.

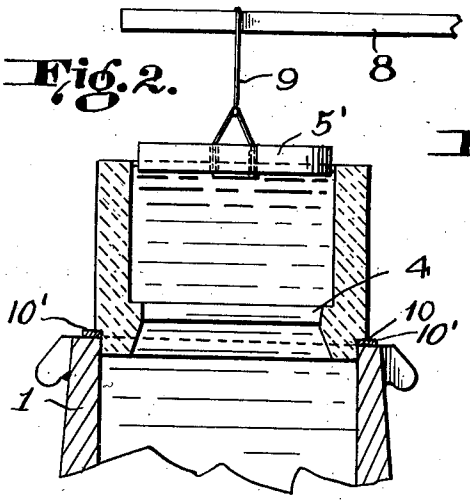
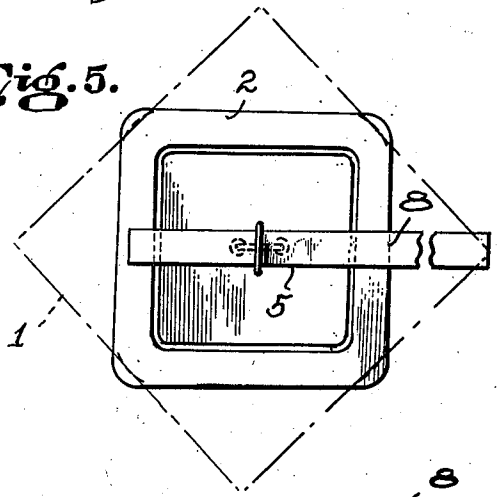


Fig. 5.



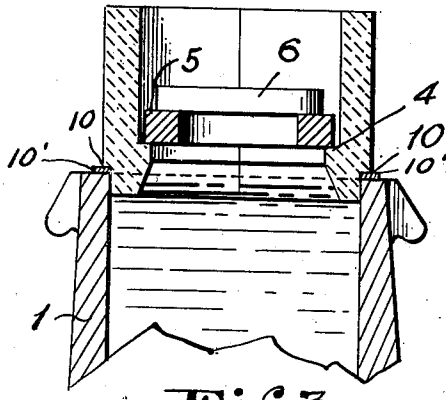
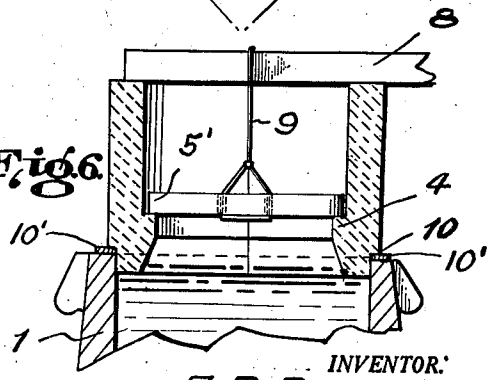


Fig. 3.

Fig. 6.



INVENTOR.
A. R. Rowe
BY J. T. Newton
ATTORNEYS.

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2,005,169

CASTING METAL INGOTS

Andrew Reed Rowe, Midland, Pa.

Application August 27, 1932, Serial No. 630,721

1 Claim. (Cl. 22—209)

This invention relates to improvements in casting steel ingots or other metal products.

In the present manner of casting steel ingots, a ladle holding a large quantity of molten metal is started at the first of a series of molds and a stopper in the bottom of the ladle is opened allowing the metal to flow from the ladle into a mold. Of course, the melted metal starts from the ladle under the pressure of the head of metal in the ladle. The molds are supplied with the metal in turn. At present, after nearly filling the first mold the ladle is moved to fill the second mold and after nearly filling the second mold it must be brought back to the first mold to complete the filling operation where a hot top is used that rises above the mold.

It is an object of my invention to allow a great many molds to be filled in succession without having to return to the first mold to complete it until all or a great many of the molds have received their first charge of metal.

I accomplish this object by placing a cover over the metal in the first mold close to the top of the metal in the mold so as to radiate back the heat of the metal and keep it from freezing on top until a large number of molds have received their preliminary or first charge of metal. It is, therefore, an important feature of my invention to keep the cover above the metal as close to the metal as possible after each successive charge to the same mold. It may be desirable under some circumstances to heat the cover, usually of refractory material, to prevent the sudden heat from the metal cracking the cover, and assist in returning the heat in order to prevent freezing of the metal after each successive charge in the mold until the filling process is completed.

With these and other objects in view which will be brought out in the further description of my invention, I will now describe it in connection with the drawing in which:—

Figure 1 is a perspective view of an improved form of hot top.

Figure 2 is a form of cover and hot top that may be used and shows the position of the hot top and cover after the second charge of metal to the mold.

Figure 3 is a second form of hot top and cover showing the height of the metal and the position of the hot top after the first charge of metal to the mold.

Figure 4 is a view of the position the cover assumes after the second charge of the metal to the device shown in Figure 3.

Figure 5 is a top view of the mold, the hot top and the cover shown in Figure 2.

Figure 6 is a view showing the position of the hot top and cover and the height of the metal after the first charge of metal to the mold, of the modification shown in Figure 2.

1 is the ordinary mold shown in the drawing as being cubical shape and, therefore, having a square top. Into this square topped mold may fit a hot top 2, also approximately cubical shape but may have rounded corners, as shown best in Figure 1. This hot top is preferably composed of refractory material. Near the bottom of the hot top are cut out portions forming ledges 3, to support the hot top on the mold 1. On the interior of the hot top ledges 4 may be formed and the hot top 2 should fit into the top of the mold loosely, as shown in Figures 2, 3, 4 and 6.

In the position shown in Figures 3 and 6 the first charge of metal to the molds has been poured and the hot top rests on its ledges 3, the hot top projecting into the top of the molten metal.

I then place a cover 5 and 6, shown in Figure 3, or 5', shown in Figure 6, to rest on the ledge 4 and it will be noticed that the cover is close to the top of the molten metal in the mold and is imperforate to the stream of metal.

In the modification shown in Figure 3 the cover consists of two portions, an outside ring shaped cover 5 and an imperforate cover 6 covering the interior of the ring shaped portion 5. These covers may be of any suitable nonheat conducting material. In the modification shown in Figures 2 and 6 I may employ only one cover 5' instead of the two part cover shown in Figures 3 and 4. I preferably attach to 5' a handle 8 by means of a wire or chain 9.

After pouring the first charge of metal into the first mold, the ladle is moved to the second mold in the series and the top 5 and 6 or 5' is inserted in the hot top and it will be noticed that the cover rests close to the top of the hot metal and will keep it in the molten state much longer than if the cover were placed on the hot top at a considerable distance from the top of the molten metal. I find that this placing of the cover close to the top of the molten metal will keep it in a melted state long enough for the ladle to be run to a large number of molds to deposit its first charge of metal in the molds. It allows the operator enough time to deposit the first charge of metal in enough of the molds so that he does not have to continuously run the heavy ladle back

and forth over the molds to make the successive charges of the metal.

After the first series of molds have been charged the ladle is brought back to the first mold and the top **6** or the top **5'** removed and a second charge of metal deposited in the molds successively. In the meantime, the metal will have frozen around the joints **10** between the hot top and the mold and the second charge of metal will bring the height of the metal almost to the top of the hot top. This will cause the top **5** of Figures 3 and 4 to rise to the position shown in those figures when the top **6** is then replaced on the ring shaped top **5**.

In the case of the modification shown in Figures 2 and 6, the top **5'** is removed and the second charge of metal will bring the height of the metal to the position shown in Figure 2 when the top **5'** is placed as shown in Figure 2.

As shown in Figures 3 and 6, the covers are close to the top of the molten metal and again, as shown in Figures 2 and 4, the covers are still close to the top of the molten metal and thus in position to prevent excess radiation of heat from the top of the molten metal so that after both charges of metal to the molds the covers are always close to the top of the molten metal. This is found from practical experience to be advantageous in keeping the top of the molten metal in the melted state to allow for escape of any gas shot down into the molten metal in the mold by the head pressure of the metal in the ladle.

Having now fully described my invention and the way it is used, what I claim is:—

The method of molding ingots comprising placing a hot top in a mold and charging the mold with metal, inserting an imperforate cover and resting it near the bottom of the hot top after the first charge of metal into the mold to obtain the maximum radiation from the cover, subsequently removing the cover and completing the charge of metal to near the top of the hot top and again placing the cover in the hot top on the melted metal so that it will cover the molten metal in the hot top at approximately the height of the metal in the hot top.

ANDREW REED ROWE.